

Syllabus

for course at advanced level

Signal Transduction

Signaltransduktion - från mask till människa

15 Higher Education Credits
15 ECTS credits

Course code:	KN8002
Valid from:	Autumn 2010
Date of approval:	2007-10-15
Changed:	2010-08-20
Department	Department of Neurochemistry
Subject	Chemistry

Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University.

Prerequisites and special admittance requirements course

Chemistry 60 ECTS, basic level, of which at least 7.5 ECTS in biochemistry or 60 ECTS in biology, basic level. In addition at least 15 ECTS in neurochemistry, molecular neurobiology, molecular life sciences or medical chemistry, or corresponding courses. Also required is knowledge equivalent to the Swedish upper secondary school course English B, or equivalent to one of the following tests; Cambridge CPE and CAE: Pass, IELTS: 6.0 (with no part of the test below 5.0), TOEFL (paper based): 550 (with minimum grade 4 on the written test part), TOEFL (computer based): 213, TOEFL (internet based): 79.

Course structure

Examination code	Name	Higher Education Credits
LIT2	Independent literature exercise	7
TEO2	Theory	8

Course content

a. The course covers various signal transduction paths in the cell. Effects of activation of ligand-regulated ion channels, G-protein-coupled receptors and receptor tyrosine kinases, and examples of other phylogenetically conserved signal paths are described. Special emphasis is placed on signal transduction in the central and peripheral nervous systems, receptor kinetics and peptide receptor signalling. Signalling in the immune system, coupling between immune system and nervous system, neuroendocrine signalling, and the influence of toxins, drugs and various diseases on signal transduction are also treated. Specific systems treated include memory, learning and clock functions. Finally treated are methods for studying signalling in the cell and in invertebrate, vertebrate and in-vitro model systems. The course is useful for continued studies in biology or chemistry (neurochemistry, biochemistry or medicinal chemistry) or for work e.g. in pharmaceutical industry.

Learning outcomes

It is expected that the student after taking the course will be able to:

- * Give an account of structure, kinetics and signal transduction paths for cell surface receptors, and the most important classes of pharmacological substances and toxins that affect receptor-mediated signal transduction.
- * Demonstrate basic knowledge of chemical neurotransmission and evolutionally conserved neuronal components and of the most important signal paths in the nervous system, and examples of signal paths in the

immune system and the endocrine system.

* Explain how different signalling paths can cooperate in more complex systems, and the mechanisms of the most common diseases that affect signalling within the cell.

* Give a cursory account of the methods and model systems available for studying signal transduction.

* Demonstrate ability to independently identify a problem within a specified field of research and to suggest and evaluate possible approaches.

Education

The education consists of lectures, group work, seminars, reports and an independent literature exercise.

Participation in literature task reporting and independent work and group education associated with this is compulsory.

After consultation with the relevant teacher, an examiner may rule that a student is not obliged to participate in certain compulsory education, if there are special grounds for this

Forms of examination

a. Measurement of takes place through:

* Written and/or oral examination

b. Grading is carried out according to a 7-point scale related to learning objectives:

A = Excellent

B = Very Good

C = Good

D = Satisfactory,

E = Sufficient

Fx = Fail

F = Fail.

c. Grading criteria for the course will be distributed at the start of the course.

d. A minimum grade of E is required to pass the course, together with a "Sufficient" grade for oral/written literature exercise report, and participation in other compulsory education.

e. Students who fail to achieve a pass grade in an ordinary examination have the right to take at least further four examinations, as long as the course is given. The term "examination" here is used to denote also other compulsory elements of the course. Students who have achieved a pass grade on an examination may not retake this examination in order to attempt to achieve a higher grade. Students who have failed to reach a pass grade on two occasions have the right to request that a different teacher be appointed to set the grade of the course. A request for such appointment must be sent to the departmental board.

Interim

Students may request that the examination is carried out in accordance with this syllabus even after it has ceased to apply. This right is limited, however, to a maximum of three occasions during a two-year-period after the end of giving the course. A request for such examination must be sent to the departmental board.

Misc

The course is a component of the Master's programme in Neurochemistry with Molecular Neurobiology, the Master's programme in Molecular Life Sciences and the Master's programme in Medicinal Chemistry, and it can also be taken as an individual course.

Required reading

Course literature is decided by the departmental board and is described in an appendix to the syllabus.